EEMB CO., LTD

Polymer Li-ion Battery

Specification

Model： **2LP505597LC-2-PCM-LD**

Capacity： **6200mAh**

Prepared	Checked	Approved

Customer：

Customer Approval（Customer confirmation）：		
Signature	**Checked**	**Approved**

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Catalog

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1. Scope

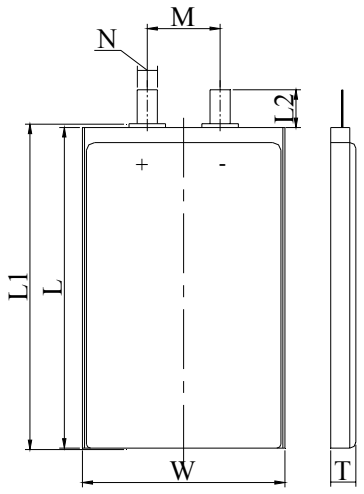
This product specification defines the requirements of the rechargeable polymer lithium-ion battery supplied to the customer by EEMB Co., Ltd.

2. Product Basic Characteristics

No.	Item		Characteristics		Remark
2.1	Model		LP505597LC		
2.2	Capacity	Nominal Capacity	3100	mAh	$0.2C_5A$
		Minimum	2900	mAh	$0.2C_5A$
2.3	Nominal Voltage		3.7	V	
2.4	Weight		Approx. 62	g	
2.5	Internal Impedance		≤ 70	mΩ	AC 1KH (50% charge)
2.6	Dimension	Length	≤ 98	mm	
		Width	≤ 55.5	mm	
		Thickness	≤ 5.3	mm	
2.7	Charge	Maximum Current	3100	mA	$1C_5A$（CC&CV）
		Limited Voltage	4.200±0.020	V	
		End-of Current	62	mA	
2.8	Discharge	Maximum Current	6200	mA	$2.0C_5A$
		End Voltage	2.750±0.005	V	
2.9	Operation Temperature	Charge	0 ~ 45	℃	
		Discharge	-40 ~ +45	℃	
2.10	Storage Temperature	1 month	-20 ~ +60	℃	
		3 month	-20 ~ +45	℃	
		12 month	-20 ~ +25	℃	
2.11	Storage Relative Humidity		65±20	%	

3. Shape and Dimensions（Unit：mm）

Item	Specification
T	Max5.3
W	Max55.5
L	Max98
L1	Max99
L2	10±1
M	30±1
N	4±0.5



4. Appearance

It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or middle deformation.

5. Specification

5.1 Electrical Characteristics

No.	Item	Criteria	Test Instructions
5.1.1	$1C_5A$ rate discharge capacity	Discharge Capacity≥ Minimum Capacity	Within 1hour after full charge, discharge to two ends of the battery with constant current $1C_5A$ to 2.75V.
5.1.2	High temp. discharge capacity	Discharge Time≥54min	After full charge, store at 45±2℃ for 2h, then discharge at the same temperature with $1.0C_5A$ to 2.75V.
5.1.3	Low temp. discharge capacity	Discharge Time≥3h	After full charge, store at -40℃±2℃ for 16h~24h, then discharge at the same temperature with $0.2C_5A$ to 2.75V
5.1.4	Cycle Life	≥300 Cycles（$1.0C_5A$） ≥500 Cycles（$0.5C_5A$）	After full charge, rest for 10 min, then discharge at constant current to 2.75V, rest for 10 minutes. Repeat above steps until the two consecutive cycles of discharge time is less than the regulated time. (300 cycles≥48min,500 cycles≥84min)
5.1.5	Capacity Retention	Discharge Time≥4.5 h	After full charge, store at 20±5℃for 28 days. Then discharge with $0.2C_5A$ to 2.75V

5.2 Acclimatization Characteristics

No.	Item	Criteria	Test Instructions
5.2.1	High Temp. and High Humidity	No deformation, no rust, no fire or explosion; Discharge time ≥36min	After full charge, store at 40℃±2℃(90%~95%RH) for 48h. After test, place at 20℃±5℃ for 2h and then discharge with $1C_5A$ to end-voltage
5.2.2	Vibration	No damnification, leakage, no fire or explosion; Battery Voltage≥3.6V	Batteries are vibrated 30 min in three mutually perpendicular directions with amplitude of 0.38mm (10~30Hz) or 0.19mm (30~55Hz) and the scanning rate of 1oct per min
5.2.3	Drop	No leakage, no fire or explosion; Discharge Time≥51 min	Batteries are dropped onto a hard board with the thickness of 18~20mm from height of 1000mm,drop freely from each positive and negative direction(six direction) of X, Y, Z for one time, after that, discharge with $1C_5A$ to end-voltage
5.2.4	Low-pressure	No leakage, no fire or explosion	Put the batteries in a sealed vacuum and reduce internal pressure gradually to lower than 11.6 kpa. Keep for 6h

5.3 Safety Characteristics

No.	Item	Criteria	Test Instructions
5.3.1	Overcharge	No fire or explosion	Put the batteries with thermocouple into the ventilation cabinet. Connect the polarities to constant voltage and adjust the current to $3C_5$A, voltage to 4.8V. Charged the cells with $3C_5$A until voltage of 4.8V and current approach 0 A.
5.3.2	Short-Circuit	No fire or explosion; The maximum Temperature: 150℃	Put the batteries with thermocouple into the ventilation cabinet. Batteries are short-circuited by connecting the positive and negative terminals with a total resistance load of 100mΩ. Watch the changes of temperature. End the test when the temperature of the batteries drops to 10℃ lower than the peak value.
5.3.3	Heating	No fire or explosion	Cell is heated in a circulating air oven at a rate of (5±2)℃ per minute to 130±2℃, and then placed for 30 minutes
5.3.4	Temperature cycle	No leakage, no fire or explosion	After full charge , place the battery in the temperature control box of 20±5℃, do the following steps: ⑴Put the battery into test chamber of 75℃±2℃and keep for 6h. ⑵Lower the temperature to -40±2℃ and keep for 6h ⑶Temperature conversion time is no longer than 30 min ⑷Repeat the above three steps for 10 cycles.
Note: Unless otherwise specified, all tests stated in this specification are conducted at the following conditions: Temp. : 20±5℃; Relative Humidity: 25%～85%.			

6. Specification of PCM

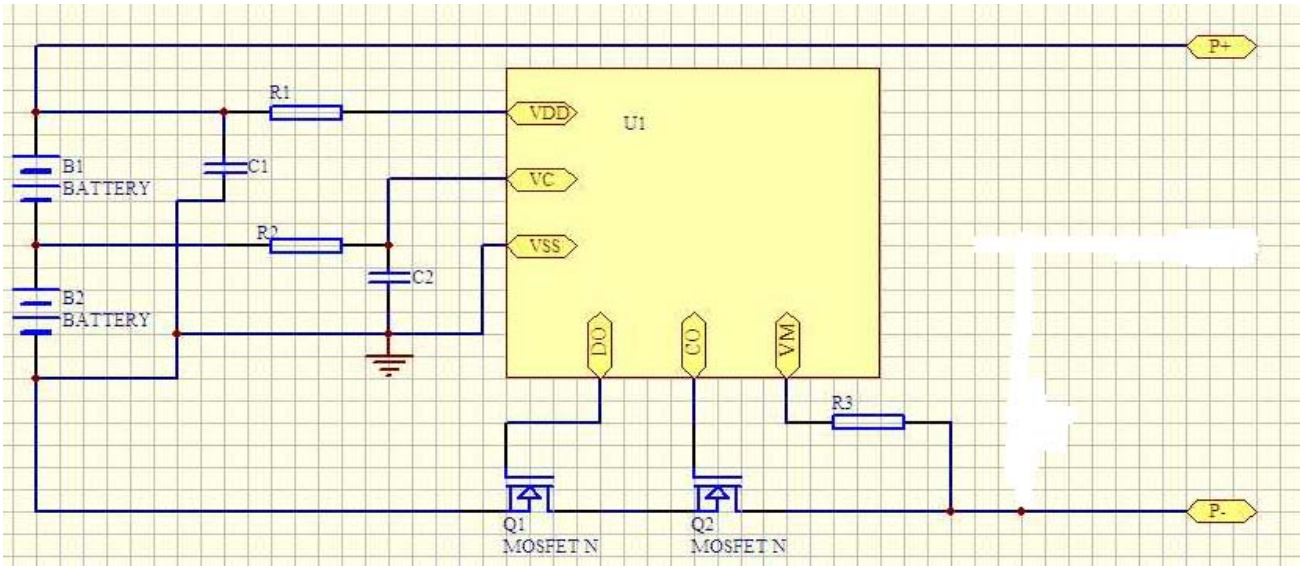
The specification shall be applied to Lithium polymer battery protection circuit module manufactured by EEMB CO., LTD.

6.1.0 Basic Specification

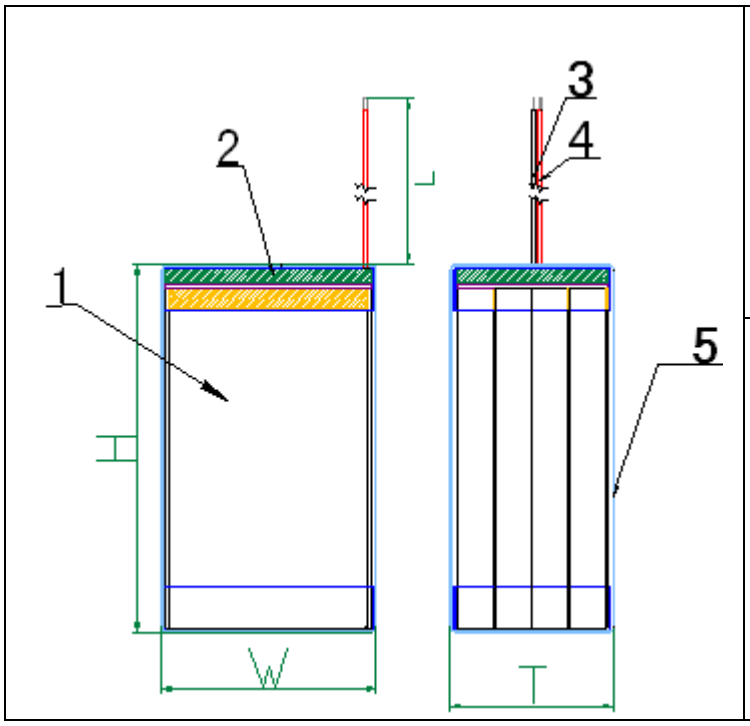
Item	Symbol	Content		Criterion	
Over charge Protection	V_{DET1}	Over charge detection voltage		4.3±0.05V	
	tV_{DET1}	Over charge detection delay time		0.96S-1.40S	
	V_{REL1}	Over charge release voltage		4.175±0.1V	
Over discharge protection	V_{DET2}	Over discharge detection voltage		2.4±0.10V	
	tV_{DET2}	Over discharge detection delay time		115ms-173ms	
	V_{REL2}	Over discharge release voltage		3.0±0.1V	
Limited to Max peak value current		Peak value(A)	Constant time (S)	5A	3S
Limited to Max loading current	Constant (A)			3A	
Short protection		Detection condition		Exterior short circuit	
		Release condition		Cut short circuit	
Interior resistance	R_{DS}	Main loop electrify resistance		R_{DS}≤70mΩ	
Current consumption	I_{DD}	Current consume in normal operation		7μA Type 15μA Max	

*Note: These specs are guaranteed by design not by production tests.

6.2.0 PCM Circuit Diagram



7. Pack's Dimension



1. Drawing:
T（max）=23mm
W（max）=57mm
H（max）=102mm
L=50±3.0mm

2. Materials:
① cell: LP505597LC
② PCM
③Wire: black (—) UL1007 AWG22
④Wire: red（＋） UL1007 AWG22
⑤Blue PVC

8. Pack's voltage and internal resistance

Voltage: 7.4V~7.8V
Internal Resistance: ≤250mΩ

9. Shelf life: One year warranty after the date of production

10. Matters needing attention

Strictly observes the following notes. EEMB are not responsible for any accident due to the handling disagreed with this instruction.

! Danger

- Strictly prohibits heat or throw cell into fire.
- Strictly prohibits throw and wet cell in liquid such as water、gasoline or drink etc.
- Strictly prohibits use or leave cell close to fire or inside of a car with temperature above 60℃. Also do not charge / discharge in such conditions.
- Strictly prohibits put batteries in your pockets or bags together with metal objects such as necklaces, hairpins, coins, or screws. Do not store or transport batteries with the above objects.
- Strictly prohibits short circuit the (+) and (-) terminals with metals.
- Do not place Cell in a device with the (+) and (-) in reverse.
- Strictly prohibits pierce Cell with sharp objects such as a needle.
- Strictly prohibits disassemble the cell.
- Strictly prohibits welding a cell directly.
- Do not use a Cell with serious scar or deformation.
- Please read the user's manual thoroughly before usage, inaccurate handling of lithium ion rechargeable cell may cause leakage, heat, smoke, an explosion, or fire, capacity decreasing.

! Warning

- Strictly prohibits put cell into a microware oven, dryer, or high-pressure container.
- Strictly prohibits use cell with dry cells and other primary batteries, or new and old battery or batteries of a different package, type, or brand.
- Stop charging the Cell if charging is not completed within the specified time.
- Stop using the Cell if abnormal heat, odor, discoloration, deformation or abnormal condition is detected during use, charge, or storage.
- Keep away from fire immediately when leakage or foul odor is detected.
- If liquid leaks onto your skin or clothes, wash well with fresh water immediately.
- If liquid leaking from the Cell gets into your eyes, do not rub your eyes. Wash them well with clean edible oil and go to see a doctor immediately.

! Caution

- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
- Charging with specific charger according to product specification. Charge with CC/CV method. Strictly prohibits revered charging. Connect cell reverse will not charge the cell. At the same time, it will reduce the charge-discharge characteristics and safety characteristics, this will lead to product heat and leakage.
- Store batteries out of reach of children so that they are not accidentally swallowed.
- If younger children use the Cell, their guardians should explain the proper handling.
- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
- Batteries have life cycles. If the time that the Cell powers equipment becomes much shorter than usual, the Cell life is at an end. Replace the Cell with a new same one.
- When not using Cell for an extended period, remove it from the equipment and store in a place with low humidity and low temperature.
- While the Cell pack is charged, used and stored, keep it away from objects or materials with static electric charges.
- If the terminals of the Cell become dirty, wipe with a dry clothe before using the Cell.

- Battery should be charged and discharged every 3 months at 0.2 C during long term storage, and then charge to 50-70% of the capacity for storage.
- Storage the cell in storage temperature range as the specifications, After full discharged, we suggest that charging to 7.4~8.0V with no using for a long time.
- Battery should be charged and discharged every 3 months at 0.2 C during long term storage, and then charge to 50-70% of the capacity for storage.
- Do not exceed these ranges of the following temperature ranges：

  Charge temperature range : 0℃ to 45℃;

  Discharge temperature range : -40℃ to 45℃.

  Store less than 1 month : -20℃ - +60℃

  Store less than 3 months : -20℃ - +45℃

  Store less than 1 year : -20℃ - +25℃

! Special Notice

Keep the cell in 50% charged state during long period storage. We recommend to charge the battery up to 50% of the total capacity every 3 months after receipt of the battery and maintain the voltage 7.4~8.0V. And store the battery in cool and dry place.